TRS-80™ Microcomputer Catalog

TANDY CORPORATION - FT. WORTH, TEXAS
NYSE STOCK ACTIVITY FOR PERIOD : 01/01/78 TO 04/30/78

AVG
DAILY
PRICE
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SHARE

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JAN   FEB   MARCH   APRIL

Radio Shack
TRS-80
VIDEO DISPLAY

The screen displays:

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***** MORE TRS-80 COMPUTERS *****

***** HAVE BEEN SOLD THAN *****

**** ANY OTHER MICRO-COMPUTER ****


       EVER
          EVER
             EVER
                EVER
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What is a computer?

Not too many years ago, the pocket calculator we take for granted today could have passed for a powerful computer, and one worth a great deal of money. Today, however, there is much more to the definition of a computer.

The computer is in some respects like a super-power calculator, yet it is very different. Calculators work with numbers. They add, subtract, multiply and divide. Computers work not only with numbers, but with alphanumeric data — names, words, stock numbers. A computer can be programmed to repeat the same function over and over. It can compare a list of stock numbers with one you have asked it to find or alphabetize a list of names. It can logically evaluate information given to it, and act on its findings. It can store large volumes of data for future use or reference. It can converse with its operator, asking questions like "Your totals don't balance, would you like to put the data in again?" or "Would you like the results printed out, or displayed on the video screen?".

Obviously, a computer is much more than just a "number-cruncher." It is literally an extension of the mind. It is to man's mind what the lever is to his arm — a machine capable of increasing his effectiveness. It can free you from repetitive exercises which do not require human judgement. It can provide facts and figures with extreme speed, giving you the time to exercise your judgement thoughtfully.

Not many years ago, a computer with the power of the TRS-80 would have cost over a million dollars. The equipment would have filled large rooms. The advancing technology of integrated circuits led to the microprocessor — literally a "computer on a chip." This, in turn, drastically reduced the size and cost. The TRS-80, a product of these advances, is manufactured and sold only by Radio Shack.

Perhaps the best way to really explain the computer is to ask the question . . .

What does a computer do?

Large computers are well known in the business world for their ability to do bookkeeping, billing, payroll, inventory control, and analysis and forecasting of business data. Laboratories, engineering firms and universities have used computers to analyze volumes of data and numbers in a wide variety of applications.

As we said, a computer works with alphanumeric information, not just numbers. It can alphabetically sort a mailing list, find subscribers who have not renewed, locate slow-moving inventory items, write purchase orders based on sales trends and current inventory levels, or simply catalog your butterfly collection. And it can become an automated teacher of math, spelling, American history or what have you. For entertainment you can spend hours playing really challenging computer games, from chess to space war.

The TRS-80 Microcomputer System is capable of performing all of these activities. In general, it differs from its larger cousins in speed and the amount of information which can be kept on line at any one time. Keep in mind the TRS-80 isn't a panacea — it's a small computer. Study your needs carefully and buy the TRS-80 system that's right for you — expansion could be the answer. For example, a simple Level-I 4K inventory system could handle 22 items (64 characters per item), while a disk system TRS-80 could store about 1300 items per data diskette. Remember, too, that you'll need to write programs (our manual tells you how) or have them prepared to suit your specific needs. Visit a nearby Radio Shack for help in choosing your system.

Why a personal microcomputer? Because today's complex lifestyles require a method of getting more things done in less time. The TRS-80 has made true computing a reality for the small business, laboratory, classroom and the home. Radio Shack's TRS-80 is *the* personal computer for anyone and everyone!
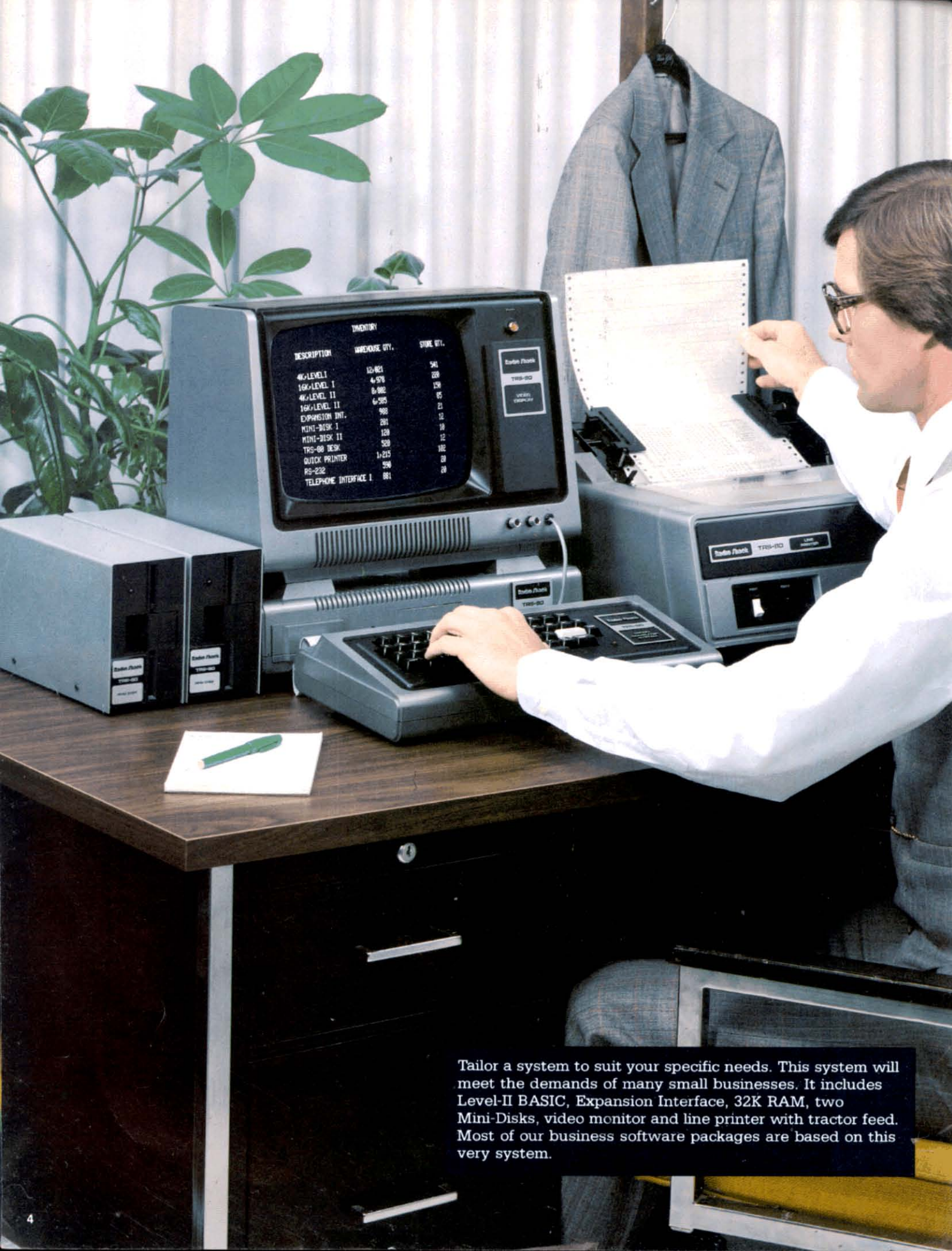
INVENTORY

DESCRIPTION	WAREHOUSE QTY.	STORE QTY.
4K LEVEL I	12·021	541
16K LEVEL I	4·970	220
4K LEVEL II	8·002	150
16K LEVEL II	6·505	85
EXPANSION INT.	988	21
MINI-DISK I	201	12
MINI-DISK I	120	10
TRS-80 DESK	520	12
QUICK PRINTER	1·215	102
RS-232	540	20
TELEPHONE INTERFACE I	081	20

Tailor a system to suit your specific needs. This system will meet the demands of many small businesses. It includes Level-II BASIC, Expansion Interface, 32K RAM, two Mini-Disks, video monitor and line printer with tractor feed. Most of our business software packages are based on this very system.

Who can use the TRS-80?

Thousands of people from all walks of life already own the TRS-80 Microcomputer. Why? Because they saw that it could serve to enrich their lives. At work and at home, the TRS-80 is exceptionally versatile. And that's why so many people are using it.

Businessmen find the TRS-80 gives them the edge on the competition. So much of their time is spent on tedious, repetitious paperwork that they often find little time to devote to the more productive areas of their job. But with a TRS-80, tasks like inventory, general ledger posting, payroll and accounts receivable can be processed quickly and effectively. Accountants find it invaluable in tax preparation, cost accounting and in keeping clients' records.

Engineering firms, manufacturers and large businesses use the TRS-80 for specific jobs too small or too costly to run on a large computer.

Programmed to catalog specimens, classify drugs and perform needed statistical and data manipulation, the TRS-80 microcomputer becomes an inexpensive and reliable clinical lab assistant.

The TRS-80 is an invaluable — yet affordable — educational tool. Computer-assisted instruction is ideal for students who require repetitive instruction and immediate evaluation of their progress.

And homeowners find more uses for the TRS-80 every day. Already they use it to manage the household budget and to keep purchase dates, serial numbers and repair history of home appliances and valuables.

How do owners like our TRS-80? A school system tells us that the TRS-80 has made computer-assisted instruction available to them for a fraction of their previous cost per student-hour. A Civil Engineer reports laborious structural concrete beam calculations requiring hours are now completed in less than ten minutes. A father writes to tell us "this investment is one of the most significant in value to our family and to the future education of our child that we have ever seen."

The limits of what the TRS-80 can do depend upon the creativity of the user, and his or her needs and imagination. As an educator put it, the TRS-80 "makes possible the tapping of human innovation and creativity on an unprecedented scale."
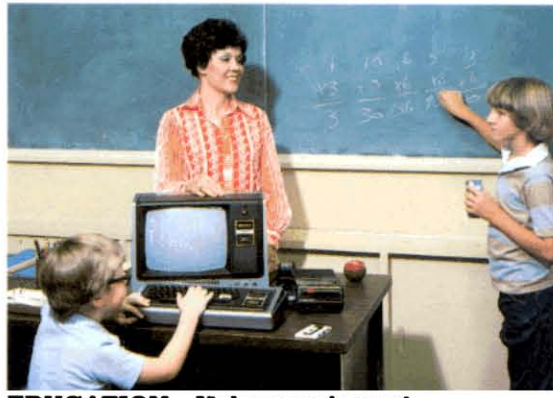
EDUCATION— Helps teach math, spelling and other subjects, keeping a progress report on each student.

LAB USE—A very economical alternative to leasing an expensive time-sharing terminal.

HOME—Manages household records, budgets, entertains with challenging games.

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Every TRS-80 we make is "burned in" for at least 24 hours before it leaves our factory for maximum reliability when you receive it.

Why the TRS-80?

Low Cost. Seldom has such a technologically advanced piece of electronic equipment been made affordable to the general public. But Radio Shack broke the price barrier, and made the personal computer a reality.

Value. Most people regard their TRS-80 as an *investment*, and often it yields a return that exceeds their fondest dreams. That's because TRS-80 is what a personal computer should be — a powerful system that's easily expandable.

Availability. The TRS-80 and its accessories are supplied through Radio Shack outlets nationwide and we have over 5800 locations. You can stop in at one near you and actually see and try the TRS-80 before deciding on your purchase.

It's easy to use. Our Level-I TRS-80 system allows the user to learn programming with absolutely no previous knowledge of computers or programming. Our superb user's manual is written in a light and humorous style that makes learning fun. And the TRS-80's BASIC language is stored in permanent Read-Only-Memory (ROM), so it's ready to use the second you turn on the power.

It's expandable. Even the smallest TRS-80 system can be expanded into our largest business system — and you pay no "premium" for not having purchased the biggest system in the beginning. With the Expansion Interface you can add more memory for a system with up to 48K RAM, plus printers, disk drives and much more. And you can convert to one of the most powerful microcomputer languages available, our Level-II BASIC.

Your nearby Radio Shack is your one-stop store for TRS-80 sales and service.

Start at your own level — modular design lets you expand to a larger, more powerful system anytime.

We build it ourselves. To insure highest quality at an affordable price, Radio Shack designed the TRS-80, and we build it in our own factories. We have taken maximum advantage of state-of-the-art engineering and our manufacturing expertise to produce the best value-to-cost ratio on the market.

Service. If repairs are ever needed, Radio Shack has a nationwide network of over 50 service centers to minimize "down time." You simply return the component in need of service to your nearest Radio Shack store — we do the rest.

Reputation. Radio Shack, with 58 years' experience to our name, is the nation's leading electronics retailer. We're backed by our NYSE-listed parent, Tandy Corporation. You can depend on us in the years to come to stand behind our product and to offer an ever-growing line of both accessories and programs.

Businesses of all sizes can afford to computerize their operations the low-cost TRS-80 way.

The TRS-80 System

Radio Shack's TRS-80 Microcomputer System is fully wired, tested and U.L. listed for electrical safety — you can put it to work immediately! It's ideal for finances, education, accounting, lab use — even for home entertainment. *And it's the computer with a full line of accessories being delivered now, with more to come in the future.*

Basic TRS-80 systems include a 12″ video monitor, Realistic battery/AC cassette recorder, power supply, 232-page user's manual and a 2-game cassette tape for playing Blackjack and Backgammon.

The TRS-80 comes to you ready to be programmed, either from pre-recorded cassette tape or from the keyboard. A "program" is simply a set of step-by-step instructions telling your TRS-80 what you want it to do. The TRS-80's programs are written in easy-to-learn, plain-English BASIC programming language (BASIC stands for "Beginner's All-purpose Symbolic Instruction Code"). The user's manual includes a beginner's course in BASIC that'll have you "talking" to your computer in no time. The TRS-80 talks back to you via its 12-inch video screen.

Inside the 53-key professional keyboard housing is the actual "brain" of the computer — a powerful Z-80 microprocessor that serves as the central processing unit (CPU). Programs and data are stored in internal "memory chips." Our lowest-priced TRS-80 computer contains 4096 bytes (4K) of user memory, or RAM (a byte being roughly equivalent to one typewritten character and made up of eight electrical signals called "bits"). It can be expanded to 16K within the keyboard unit and to 48K by using the Expansion Interface with additional memory options.

Note — the Z-80 is an 8-bit microprocessor and can address a total of 64K of memory. Both ROM and RAM are addressed in the TRS-80, along with some internal "overhead." In a 48K RAM configuration, the last memory address is 65,535 — the usual ending address for a 64K computer.

The "Read-Only Memory" chips contain the "BASIC interpreter" software. The interpreter accepts plain-English commands and statements from the programmer and translates them into the numeric language of

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the Z-80. You can access the Z-80's numeric "machine language" directly by using our "T-Bug" monitor program, available on cassette tape, or in "assembly language" by using our "Editor/Assembler" tape. (Both of these tapes are suggested only for advanced programmers with a knowledge of machine and assembly language.)

The Realistic cassette recorder lets you record and play your own programs or use one of Radio Shack's prepared programs — simply run the cassette and begin computing. The recorder is included free of extra charge with each basic TRS-80 system. Other recorders may be used — with varying degrees of success — but only if they have automatic recording level capability.

The video monitor looks like a standard television set without the channel selector. It features a wider bandwidth than most TV sets for a sharper display of printing and graphics. The monitor operates on ordinary 120-volt AC, 60 Hz house current. Foreign versions are available in other countries and are sold only overseas by Tandy Electronics outlets. The computer cannot be connected directly to a standard TV set.

For access to other hardware, the TRS-80 utilizes a unique 40-pin bus (connector system) that can attach the TRS-80 to our Expansion Interface, or other external devices.

Housed in the finest ABS material, the TRS-80 is virtually unbreakable. It may be left "on" for extended periods of time with no adverse effects, as long as the cooling vents are not obstructed.

Level-I 4K System. Cat. No. 26-1051.
Level-I 16K System. Cat. No. 26-1053.
Level-II 4K System. Cat. No. 26-1054.
Level-II 16K System. Cat. No. 26-1056.

TRS-80 Microcomputer Specifications

Microprocessor: Advanced Z-80 8-bit processor. Clock speed, 1.78 MHz.
Keyboard: Integrated, full-size, 53-Key professional-type.
Video Display: Memory mapped, all graphics and alphanumerics controlled by BASIC commands. Cursor control. Automatic scrolling.
   Text: 16 lines of up to 64 characters with Level-I. With Level-II, you may select an optional mode of 32 characters per line.
   *Graphics:* 128 horizontal by 48 vertical. Graphics and text can be combined in any manner by software.
Memory: Includes 4K Read-Only Memory (ROM), 4K Random Access Memory (RAM). Internally expandable in the computer case to 12K ROM and 16K RAM. Total memory capability of 60K.
Input/Output: Computer-controlled cassette interface. Expansion port built-in.
Power: Power Supply; 120VAC, 60 Hz, 50 watts. Video Monitor; 120VAC, 60 Hz, 50 watts. Both U.L. listed.
Dimensions: Keyboard, 16½x8x3½". Video Display, 16½x13½x12". Power Supply, 2⅝x2⅓x3¼".
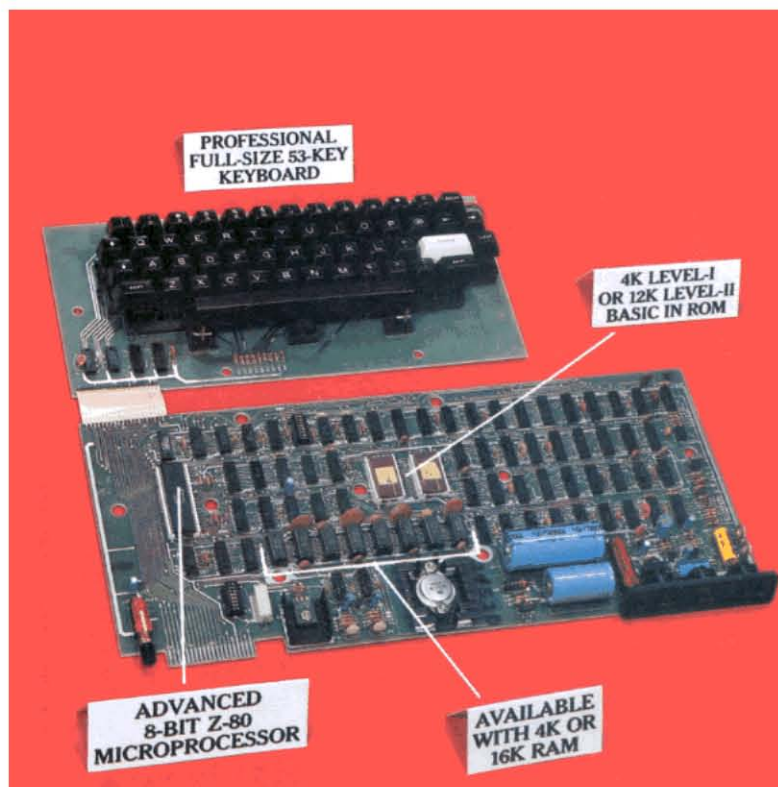
The entire computer is housed within the compact keyboard unit.
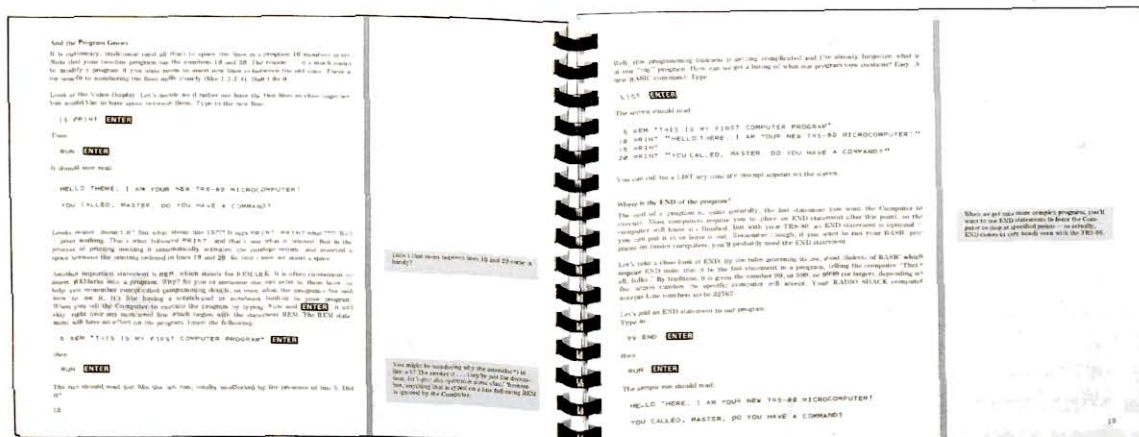
Level-I BASIC Language

Level-I is a simplified version of BASIC programming language. Level-I, together with our outstanding owner's manual, lets you learn how to program quickly and easily — *even if you have no prior knowledge of computers or programming*.

Level-I is stored in 4K of ROM, so it is ready to use the instant you turn on your TRS-80. Level-I includes most standard BASIC commands, video graphics, 250-baud cassette input/output, floating point arithmetic, numeric array, limited string variables and command abbreviations. Following is a summary of Level-I BASIC:

ABS(X) — returns the absolute value of x.
CLOAD — loads a program from cassette tape.
CLS — clears video screen.
CONT — continues program execution after BREAK or STOP.
CSAVE — records a program on cassette tape.
DATA — holds data to be read by a READ statement in a program.
END — ends program execution.
FOR-NEXT-STEP — sets up a program loop.
GOSUB — sends the program to a specified subroutine.
GOTO — causes program execution to jump to a specified line number.
IF-THEN — tests for a condition; specifies next action if condition is true.
INPUT — allows keyboard entry of data during program execution.
INPUT # — inputs data from cassette tape.
INT (x) — returns the integer value of x.
LET — assigns a value to a variable (optional).
LIST — displays program in memory on the video monitor.
MEM — returns number of free memory bytes.
NEW — clears program from memory.

ON — multi-way program branch, used with GOTO or GOSUB.
POINT — tests to see if a specified graphics point is turned on or off.
PRINT — displays information on video screen.
PRINTAT — allows printing at a specified video screen location.
PRINT # — records data on cassette tape.
READ — reads information from DATA statement in a program.
REM — remarks.
RESET — turns off a specified graphics point on video screen.
RESTORE — causes next READ to start over at beginning of DATA.
RETURN — returns program to its original sequence after subroutine execution.
RND(1) — generates a random number >0 and <1.
RND(X) — generates a random number >1 and $\leq$ X.
RUN — starts program execution.
SET — lights up a specified graphics point on the video screen.
STOP — stops program execution.
TAB — begins printing at a specified number of spaces from the left margin of the video screen.
Variable names allowed:
  Numeric variables — A through Z.
  String variables — A$ and B$ (16 characters each — maximum).
Array variable — A(n) (n limited by available memory).
Accuracy of numeric variables — 6 significant digits.

Our expertly prepared owner's manual will quickly take you from hooking up your system to actually running — and writing—your own programs. You don't have to know a thing about computers because it's written by an educator in an easy-to-read, light-hearted style that makes learning fun.

Level-II BASIC Language

Level-II is an advanced or "extended" version of BASIC programming language. It offers vastly increased computing power, faster execution time, faster cassette operation (500 baud), and increased numeric accuracy of up to 16 significant digits (intrinsic functions remain at 6-digit accuracy). In addition, you get formatted printing, program editing (with extensive editing commands), error trapping, named files, multi-dimension arrays, comprehensive string variable handling, automatic line numbering, tracing, keyboard rollover and many other features which will delight the advanced programmer. Of course, a detailed 140-page manual is included.

Level-II allows the variable names A-Z, A1-Z9 and AA-ZZ to be used for single, double and integer-precision numeric variables, as well as string variables. The same name may even be used simultaneously for four different types of variables in one program when variable specifiers are employed (AB!, AB#, AB%, and AB$). Multi-character variable names such as "PROFIT" are allowed, but only the first two characters are significant. Program lines, logical lines and string variables may be up to 255 characters long, although video screen lines are limited to 64 characters (long lines overflow to the next screen line). 32-character lines are software selectable (wide letters) with Level-II. Also provided are the necessary commands to access external devices and ports.

Level-II includes 23 specific error codes which can also be used to generate an error, in order to test error-trapping routines. Level-II users are supplied with a conversion program which converts Level-I program format and baud rate to Level-II (minor program editing may be required). Level-II uses a compressed storage format allowing some programs to be stored in fewer bytes of memory than they were in Level-I, even though Level-II does not allow abbreviation of commands. In addition to the Level-I features listed on the previous page, Level-II offers:

ASC (A$) — returns ASCII code for first character of A$.
ATN (X) — arctangent of X in radians.
AUTO — automatic line numbering.
CDBL (X) — converts to double precision.
CHR$ (X) — returns ASCII character, function, or graphic character represented by the code X.
CINT (X) — converts to integer precision.
CLEAR — clears variables from memory.
CLEAR (X) — reserves string variable space.
CLOAD "FILENAME" — loads named file.
CLOAD? — verifies CSAVEd program.

COS (X) — cosine in radians.
CSAVE "FILENAME" — records named file.
CSNG (X) — converts to single precision.
DEFDBL — defines specified variables as double precision.
DEFINT — defines specified variables as integer precision.
DEFSNG — defines specified variables as single precision.
DEFSTR — defines specified variables as strings.
DELETE — Deletes specified line(s).
DIM — reserves space for arrays.
EDIT — enters edit mode.
ELSE — in conditional branch statement, directs execution if named condition is not met: (IF...THEN...ELSE...).
ERL — returns line # of an error.
ERR — returns code number of an error.
ERROR (X) — generates error # X.
EXP (X) — raises e to the power of X.
FIX (X) — truncates X. (drops decimal points).
FRE (A$) — returns free string space.
FRE (0) — returns free memory space.
INKEY$ — inputs a string value without pausing the program.
INP (X) — inputs one byte from port X.
INPUT - #1 — inputs data from tape recorder #1.
LEN (A$) — returns length of A$.
LEFT$ (A$, 4) — returns left portion of A$ to the fourth character.
LLIST — lists program to line printer.
LOG (A) — natural log of A.
LPOS (0) — returns carriage position of line printer.
LPRINT — prints to line printer.
MID$ (X$, 4, 8) — characters 4-8 of X$.
NEW — erases all of memory.
OUT X,Y — output byte Y to port X.
PEEK (X) — returns contents of memory location X.
POKE X,Y — puts byte Y in memory location X.
POS (0) — returns the cursor position.
PRINT @ — prints at a specified screen location.
PRINT USING "$$##, ###"; A — prints data A using specified format.
RANDOM — randomizes random number generator.
RESUME — returns from an on error-trapping routine.
RIGHT$ (C$, 7) — returns the last 7 characters of C$.
SGN (X) — returns 1 if x >0, 0 if x = 0, and -1 if x<0.
SIN (X) — sine of X in radians.
SQR (X) — square root of x.
STR$ (A) — converts the number A to a numeric string.
STRING$ (20, " ") — prints a line of 20 asterisks.
SYSTEM — places TRS-80 in a mode to accept loading of machine language tape.
TAN (X) — tangent in radians of x.
TRON — initiates trace mode.
TROFF — cancels trace mode.
USR (0) — allows access to machine language subroutine.
VAL (A$) — converts numeric string to a number.
VARPTR (C) — returns the address where variable 'C' is stored in memory.

Keys to a More Versatile TRS-80

Level-II BASIC (ROM) Kit

When you've mastered our Level-I programming language, you can move up to maximum computing power with our Level-II BASIC. Conversion is easy — we simply exchange the ROM "chips" in your TRS-80 for chips containing the Level-II language. Your local Radio Shack store can arrange for the exchange to be made in our nearest service center. Then just take your keyboard into the store — installation is included in the kit price.

Each Level-II kit includes a 140-page manual, Level-II Blackjack/Backgammon tape, and conversion tapes to convert your existing Level-I program and data tapes to Level-II format. Minor programming editing may be required after conversion. Level-II may be incorporated into either a 4K or 16K RAM TRS-80. Order Cat. No. 26-1120.

16K Memory (RAM) Kit

As your needs increase, you may want more internal memory in which to store programs and working data. The TRS-80 is designed for easy upgrading to a full 16K of RAM memory inside the keyboard unit. Your nearest Radio Shack store can arrange for our local repair center to exchange your 4K RAM "chips" for 16K chips. Then just take your keyboard into the store — we do the rest. Installation is included in the kit price.

Radio Shack's 16K memory option can also be installed in our Expansion Interface. Your interface can contain a maximum of 32K of additional memory, for a system total of 48K of RAM. (The keyboard must be upgraded to 16K before additional memory is added to the Expansion Interface.) Order Cat. No. 26-1101.

Upgrading your TRS-80 is easy! Just bring in your keyboard unit to have your ROM or RAM chips exchanged.

TRS-80 C-20 Certified Computer Cassettes

You'll want to store all of your important programs on our certified digital cassette tape. These tapes are leaderless, and individually tested to insure against loss of any data. Order Cat. No. 26-301.

TRS-80 Computer Carrying Cases

Take your TRS-80 system wherever you go! One case holds the video monitor, the other will hold keyboard unit, power supply, cassette recorder, cables and cassettes. Black leatherette vinyl. Hand carry only — not for shipping. Order Cat. No. 26-500.

The Key to a More Powerful TRS-80

TRS-80 Expansion Interface

Expansion is a key word in the TRS-80 philosophy. The TRS-80's modular design lets you expand to just the system you want. Of course, you can add 16K RAM and Level-II BASIC to the keyboard unit. Beyond that point, the Expansion Interface becomes the hub of expanded TRS-80 computer systems.

The Expansion Interface measures 4½x16½x8″ and is designed to sit directly under the video monitor acting as a base for it. The TRS-80's power supply module, and an identical one for the Interface, are housed inside the interface enclosure. Space is also provided for our optional RS-232-C Serial Interface Board.

A ribbon cable approximately 6″ long connects the interface to the TRS-80 bus connector. The Interface provides output connectors for our TRS-80 printers, disk drives, dual cassette recorders, and an RS-232-C serial port, as well as an extension of the TRS-80 bus.

Modular design lets Interface act as a base for the Monitor.
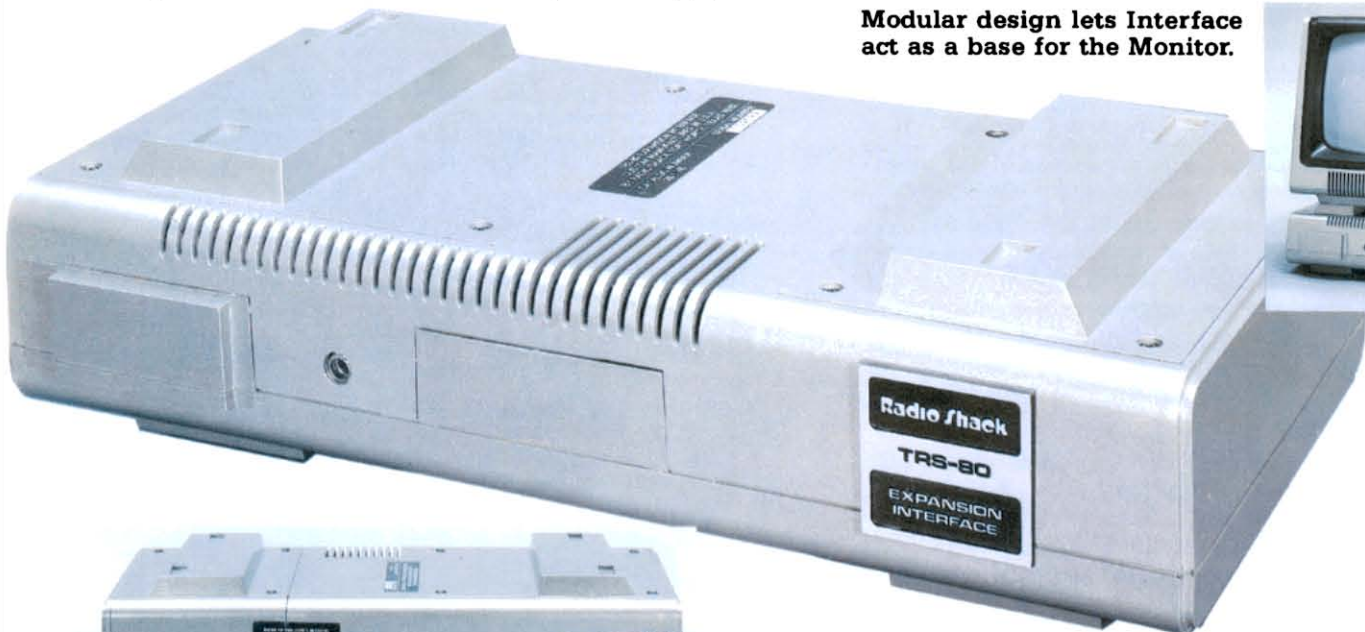
Rear outlets for power supply cords, cassette and disk drive cables.

TRS-80's Power Supply fits inside.

All cable plugs are neatly covered with plastic shrouds

The controllers for (electronic circuits needed to control) up to four TRS-80 Mini Disk drives, a printer and dual cassette recorders are an integral part of the Expansion Interface, as are the provisions for an extra 16K or 32K of optional RAM. A "Real Time Clock" allows your TRS-80 to perform functions or gather data in relation to the time of day (Requires either Disk BASIC or a machine language subroutine available on cassette tape).

The printer output port is a standard Centronics parallel circuit. This parallel port and our RS-232-C serial port allow connection of a variety of peripheral devices. Pin-out information is provided in the owner's manual. Each requires 120VAC, 60 Hz, 50 watts. U.L. listed.

Expansion Interface with 0 RAM. Cat. No. 26-1140.
Expansion Interface with 16K RAM. Cat. No. 26-1141.
Expansion Interface with 32K RAM. Cat. No. 26-1142.

TRS-80 Mini-Disk System

The TRS-80 Mini-Disk system is a storage medium allowing immediate access to the large amounts of data and programs you will need for accounting, inventory control, mailing lists and other jobs. Up to 4 drives can be attached through the Expansion Interface, furnishing 55,000 to about 310,000 bytes of on-line storage. The first Mini-Disk drive you purchase includes our powerful TRSDOS (Disk Operating System software) and Disk BASIC on diskette. This diskette allows about 55K of user storage space. TRSDOS and Disk BASIC use about 10K of the TRS-80's RAM, so a minimum of 16K is required, along with Level-II and an Expansion Interface.

The magnetically coated 5¼" diameter Mylar diskette is permanently housed in a protective jacket. The diskette is inserted in the drive and rotated at 300 RPM. Data is written and read from the disk by a magnetic head which moves across the diskette's 35 tracks. Each track consists of ten 256-byte sectors. Certain system information and a directory are required on each diskette, leaving 85,760 bytes of space available (each) on the second, third and fourth drive.

The Mini-Disk system can record or read stored information extremely fast. A 13,000-byte program which takes 3½ minutes to load from cassette tape (Level-II) will load in less than 20 seconds from disk.

And you may read information one file after the other (sequential), or go directly to any sector without reading the preceding files (random).

The system diskette containing TRSDOS and Disk BASIC must always be in your first drive unit. TRSDOS allows you to copy a diskette (BACKUP) even in a one drive system. For Mini-Disk drive I, order Cat. No. 26-1160. For Mini-Disks II, III or IV, order Cat. No. 26-1161.

Mini-Disk System Specifications

Disk Format: 35 Tracks; 10 Sectors per Track; 256 Bytes per Sector; 89,600 Bytes per Diskette. *Disk Size:* 5¼" floppy disk. *Data Transfer Rate:* 12,500 bytes-per-second. *Disk Speed:* 300 rpm. *Latency:* 100 mS (average). *Track Access Time:* 200 mS average, 600 mS to cross all 35 tracks. *Average Backup Time:* 1:10 minutes (including formatting). *Memory Usage:* TRSDOS, 4.2K RAM; Disk BASIC, 5.8K RAM. *Power:* 120VAC, 60 Hz, 35 watts. U.L. listed. *Size:* 6½ x 3½ x 13¼".

As many as four disk drives may be connected to one TRS-80 system.

TRS-80 TRSDOS and Disk BASIC

TRSDOS. Included in TRSDOS is the software needed to operate the disk system, plus certain programs for file management, called Utilities.

On power-up, TRSDOS is automatically loaded into RAM, occupying 4.2K. An overlay scheme is used so that only the needed portions of TRSDOS use RAM space at any given time. When Disk BASIC is called in, an additional 5.8K RAM is used. Additionally, about 280 bytes are required for each file the user requests, up to 15, hence the minimum RAM requirement for use of a Mini-Disk system of 16K.

Radio Shack intends to continually upgrade TRSDOS, adding new features with each new version, so check with your local Radio Shack store for information on the latest available version. For reference, here are some of the features of version 2.1.

Utilities:

APPEND — Adds one file to the end of another (primarily data files).
ATTRIB — Assigns or changes protective file passwords with 5 levels of protection to prevent unauthorized file access.
AUTO — Automatically executes a command on power-up.
BACKUP — Copies all of a diskette to another diskette. (works even on a one drive system by swapping disks back and forth).
CLOCK — Provides constant time display in the upper right corner of the video screen.
COPY — Copies a file.
DATE — Sets the date which can be accessed by TIME$ in Disk BASIC.
DEBUG — Machine language debugger, allowing you to set break points, execute single-step instructions, dynamically watch registers during execution and display memory in hexidecimal or ASCII.
DIR — Displays a directory of all files on a specified disk drive. If requested, will include logical record length, end of file and space used.
DUMP — Stores a machine language program from memory to disk.
FORMAT — Format and verify a blank diskette. Unusable sectors are marked.
FREE — Displays free space remaining on diskettes in all drives.
KILL — Deletes a file, making space available for reuse.
LIB — Displays all TRSDOS system commands.
LIST — Lists a file to the video display.
LOAD — Loads a machine language program from disk to memory.
PRINT — Lists a file to the line printer.
PROT — Changes protection status of all non-system files on a diskette.
RENAME — Changes the name of a file.
TAPEDISK — Loads system tapes into RAM, then to a specified disk file.
TIME — Sets the time of day for the CLOCK display and TIME$ BASIC command.
TRACE — Prints the program counter on the video display.

TRSDOS Diskette, order Cat. No. 26-310. Blank Diskettes are available individually, Cat. No. 26-305, or in a pack of 3, Cat. No. 26-405.

Radio Shack Disk BASIC. TRSDOS will enter Disk BASIC whenever the command BASIC is entered. Typing CMD "S" under BASIC will return control to TRSDOS (if "BASIC 2" is entered, the TRS-80 will be in Level-II BASIC with full RAM available). Disk BASIC enhances Level-II with the addition of several new commands.

Disk BASIC allows either random or sequential disk files. Programs may be stored in BASIC as ASCII or compressed format files. All files are named. A Filespec name may consist of an 8-character name, a 3-character extension, an 8-character password and a specific disk drive number. (All except the file name are optional.)

Extension Commands:

CMD "D" — Calls up DEBUG (see DOS).
**MID$** — Allows MID$ on the left side of an equation.
INSTR — Tells you the position of one string within another.
DEF FN — Allows user-defined functions.
HEX CONSTANTS — You can type-in hexadecimal and octal constants by preceding them with "&H" or "&".
DEFUSR — Defines an entry point for one of 10 user machine language routines.
USRn — Calls one of 10 possible machine language routines. You can both send and return an argument.
CMD "T" — Turns off 25 msec heartbeat. This *must* be done before cassette I/O is done.
CMD "R" — Restarts the 25 msec heartbeat (should be on for disk operations).
TIME$ — Returns date and time as a text string. Time and date are set by the TIME and DATE commands under TRSDOS.

File Commands:

OPEN — Opens a file for use. This command specifies sequential/random input or output, the file number and file name.
CLOSE — Closes a file which is currently open. The file must be reopened for use.
SAVE — Saves a BASIC program onto disk. (You can CLOAD a tape program, then easily put it on disk.
LOAD — Loads a BASIC program from disk into memory.
MERGE — Combines a BASIC program with another program currently in memory.
DISKDUMP — A program to write a disk file to the line printer (or video) sector by sector in hex code and ASCII, 16 bytes at a time. Shows how data formats are stored on a disk.
KILL — Deletes a file.
LINE INPUT — Reads an entire line of data from disk into a string variable.
EOF — Function to check for end of file.
PRINT#filenum — Write to a sequential file.
INPUT#filenum — Reads from a sequential file.
FIELD — Specifies the format of a random file record.
LOF — Returns highest physical record number used in a file.
LSET/RSET — Places data into a random file buffer in preparation for a write to disk.
PUT — Writes data from a buffer to a specified record number in a random file.
GET — Reads a specified record from a random file into the file's associated buffer.

The following functions are available to convert numbers to text and back again. This way a 5-digit integer may be stored as 2 bytes rather than 5 ASCII characters, saving disk space.

Type	Convert to text	Convert to numeric	Bytes
integer	MKI$	CVI	2
single precision	MKS$	CVS	4
double precision	MKD$	CVD	8

TRS-80 Quick Printer.

For any job that requires a small, single-copy printout, our Quick Printer will fill the bill. It's a fast, compact, low-cost line printer ideal for general use.

The Quick Printer delivers 150 lines per minute on a roll of 4.75-inch wide aluminum-finish paper. No ribbon is needed to produce a black-on-silver copy which makes excellent reproductions on office copiers. The paper is unaffected by light, heat or humidity.

All TRS-80 keyboard characters (except arrows) can be printed. Upper and lower case letters are printed, although they all appear as upper case on the monitor. TRS-80 graphics are not supported.

All Level-II line printer commands are used.

Characters are formed by a 5x8 dot matrix. Variable character width (20, 40, or 80 characters per line), automatic underlining and an audible signal are all fully software controllable.

Features paper-empty light, print select (on/off), paper advance and power on/off switch with pilot light. The Quick Printer requires the Expansion Interface, Level-II BASIC and a connecting cable. Order Cat. No. 26-1153. Printer connection cable, Cat. No. 26-1401.

Quick Printer Specifications

Print Density: 20, 10 or 5 characters per inch, software selectable (80, 40 or 20 cpl). *Print Speed:* 150 lines per minute. *Paper:* Aluminum coated roll, 4.75" wide by 131' long. (Available through Radio Shack stores) *Dimensions:* 4¼ x 13 x 10½". 10 lbs. *Power:* 120VAC, 60 Hz. 40 Watts. U.L. listed.
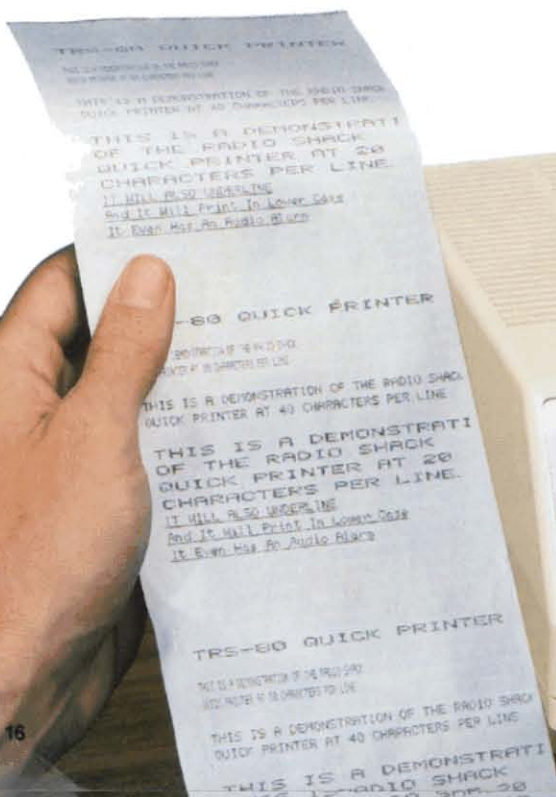
TRS-80 Line Printers

TRS-80 Line Printers are medium-speed, 5x7 dot matrix impact printers suitable for business, education and home use. Both use the standard 64-character upper case ASCII character set, but do not support TRS-80 graphics.

The 26-1150 friction feed printer uses roll or "fanfold" paper, one or two copies. The 26-1152 with tractor feed uses only fanfold paper with feed holes in the margins and will produce up to 5 carbon copies. A continuous-loop cloth ribbon lasts approximately as long as a standard typewriter ribbon. Replacements are available through Radio Shack.

The width of the letters, or "print density," is continuously variable from 10 to 16.5 characters per inch. Print density affects print speed. At maximum density, the printers will produce 132-character lines at a speed of 21 lines per minute.

The 26-1150 friction-feed model (like a typewriter) includes a holder for roll paper up to 9.8" wide. The tractor-feed version is required for multiple copies and exact placement of type on preprinted invoices, payroll checks, and so on. Tractor width is adjustable from 3 to 12.1 inches. Top of forms control is available through software.

Both printers require Level-II (or Disk BASIC), a connecting cable, and the Expansion Interface. All Level-II PRINT commands except PRINT@ can be used (preceeded by an "L"). Operating and service manuals are included. Tractor Feed model, 26-1152. Friction Feed model, 26-1150. Printer-to-Expansion Interface Connecting Cable (one required), 26-1401.

TRS-80 Line Printer Specifications

Print Density: 10-16.5 characters per inch (80-132 characters per line). *Print Width:* Up to 8". *Print Speed:* 60-100 characters per second. *Vertical Line Spacing:* 6 lines per inch. *Dimensions:* 9.5 x 19.8 x 19.5". *Weight:* 45 lbs. *Power:* 120VAC, 50/60 Hz, 3 Amps. 360 Watts. U.L. listed.

**Left, Friction Feed model 26-1150. Below, Tractor Feed model 26-1152.**

RS-232-C Serial Interface Board

You can let your TRS-80 communicate with the "outside world" by using our TRS-80 RS-232-C Serial Interface Board. The term RS-232-C refers to a specific EIA (Electronics Industries Association) standard which defines a widely accepted method of interfacing computer hardware. It lets you connect the TRS-80 to a variety of accessories such as modems, card readers, line printers and acoustic couplers.

The RS-232-C board mounts inside our Expansion Interface. A cable is provided for connection to external equipment such as Radio Shack's Telephone Interface or perhaps your own serial line printer. Included is a comprehensive user's manual and a cassette tape program which allows the TRS-80 to act as an interactive terminal for communication with a remote time-sharing computer system. Order Cat. No. 26-1145.
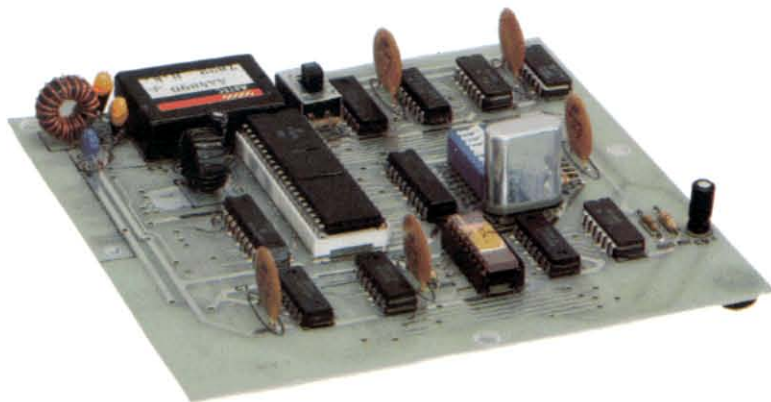
TRS-80 RS-232-C Specifications

Baud Rate: Switch selectable in 8 steps from 110 to 9600 baud. Software controllable in 16 steps from 50 to 19,200 baud. *Stop Bits:* Selectable 1 or 2. *Word Length:* Selectable 5 or 8 bits. *Data In/Data Out Ports:* Switch reversible. *Logic State Sensing:* Clear to send, Data Set Ready, Carrier Detect, Ring Indicator. *Software Controllable Outputs:* Data Terminal Ready, Request to Send. *Software Control:* All functions except Data In/Data Out reversing are fully software controllable.

TRS-80 Telephone Interface I

Radio Shack's Telephone Interface I lets the TRS-80 "talk" with other computer equipment over the phone! After the proper number has been reached, you simply place your telephone handset in the Interface's cradle — without a single electrical connection to your telephone lines.

This Radio Shack coupler converts a serial stream of data from the TRS-80 RS-232-C interface into selective audio tones which are then transmitted over standard telephone lines. It can also reverse the process, decoding selective audio tones and feeding them into the TRS-80 through the RS-232-C interface. (The RS-232-C allows the TRS-80 to communicate with the outside world via a 2-wire connection, but with electrical signals. Since electrical signals cannot be sent over a voice telephone line, the Telephone Interface converts those signals to audio tones so that the connection can be made over long distances via telephone.) The TRS-80 Telephone Interface I operates in the "originate only" mode, meaning that it can send information to other hardware. It is capable of "two-way communication" only with another computer system having "originate and answer" capabilities. Order Cat. No. 26-1170.

Specifications

Baud Rate: 300 baud. *Mode:* Originate only, half or full-duplex. *Carrier Detection Level:* -40dbm. *Transmit Level:* -17 dbm at 1070 Hz. *Power Requirement:* 120VAC, 60 Hz, 5 watts. U.L. listed.

TRS-80 Manuals

Level-I User's Manual. Our Level-I manual has received outstanding reviews as one of the best available "courses" in BASIC. That's because it can teach just about anyone to program — even those who never dreamed of operating a computer. You'll find that its humorous, easy-to-read style makes learning fun.

232 pages containing twenty-six chapters introduce you to the various capabilities of the computer with exercises that give you a chance to try out your knowledge on your own — with answers in the back of the manual. There's even a section of user's programs — some are just for fun, others are for the home and business, education and more.

Learn to program the easy way, with the TRS-80 User's Manual. Included with TRS-80 systems, or available separately as Cat. No. 62-2016.

DOS/Disk BASIC Manual. A complete user's manual for TRS Disk Operating System and Disk BASIC. Included with our Mini-Disk System, or available separately as Cat. No. 26-2104.

Level-II BASIC Reference Manual. This manual is included with Level-II equipment and Level-II conversions, or is available separately. The 140-page Level-II manual is an invaluable reference source for this very extensive and very powerful programming language. It assumes the reader is familiar with Level-I programming. For your copy, order Cat. No. 26-2102.

TRS-80 Technical Manual. By popular demand, we have gathered together the schematics, logic and timing diagrams for Level-I and Level-II, and combined them with sections on circuit theory and circuit description. If you're a hobbyist or a computer engineer wanting technical details on the computer, you'll want the TRS-80 Technical Manual. Order Cat. No. 26-2103.

TRS-80 Software

Software (programs) are now available on cassette tape for both Level-I and Level-II TRS-80 systems. New software is being added monthly, including business programs on diskettes. Check with your nearest Radio Shack store for current software information.

TRS-80 System Desk

Serious computer users can integrate expanded TRS-80 installations into our attractive, functional desk unit. The keyboard and Expansion Interface fit into recessed spaces in the desk top, with interconnecting wiring concealed. A bay under the right side of the desk can house from one to four Mini-Disk drive units. And you can place our TRS-80 Quick Printer on the right side of the desk and still have work space left over. 27x48x27". Order Cat. No. 26-1301.

A floor stand for TRS-80 Line Printer is also available. Order Cat. No. 26-1302.